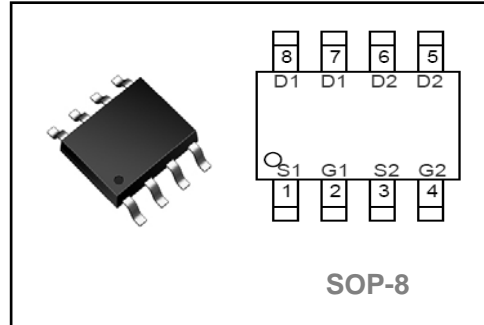


N- Channel and P-Channel Silicon MOSFETs

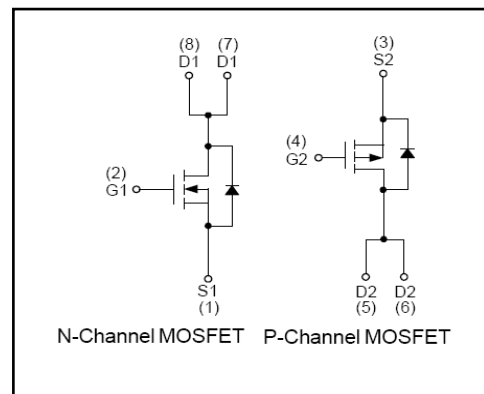
Features

- Low On-resistance.
- Composite type with an N-channel MOSFET and a P-channel MOSFET driving from a 4.5V/-4.5V supply voltage contained in a single package.
- High-density mounting.
- RoHS compliant.



Applications

- General-Purpose Switching Device
- For motor drives, inverters.



Absolute Maximum Ratings at Ta=250C

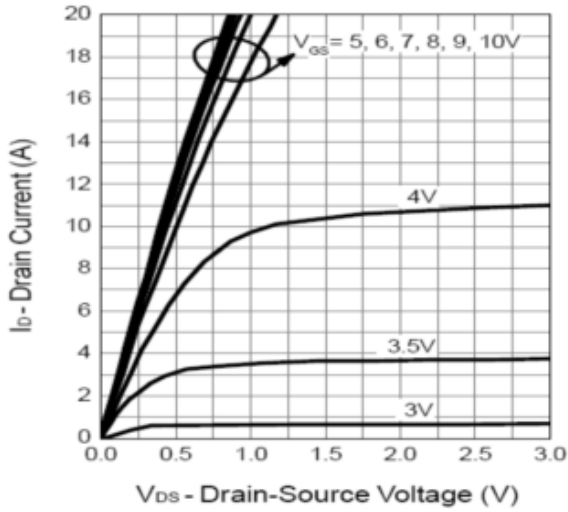
Parameter	Symbol	Conditions	Ratings		Unit
			N-Ch	P-Ch	
Drain-to-Source Voltage	V_{DSS}		60	-60	V
Gate-to-Source Voltage	V_{GSS}		± 25	± 25	V
Drain Current (DC)	I_D		5	-3.5	A
Drain Current (Pulse)	I_{DP}	$PW \leq 10\mu s$, duty cycle $\leq 1\%$	20	-14	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (1000mm ² ×0.8mm) 1unit	1.3		W
Total Dissipation	P_T	Mounted on a ceramic board (1000mm ² ×0.8mm)	1.7		W
Channel Temperature	T_{ch}		150		°C
Storage Temperature	T_{stg}		-55~+150		°C

N-Channel Electrical Characteristics at Ta=25°C

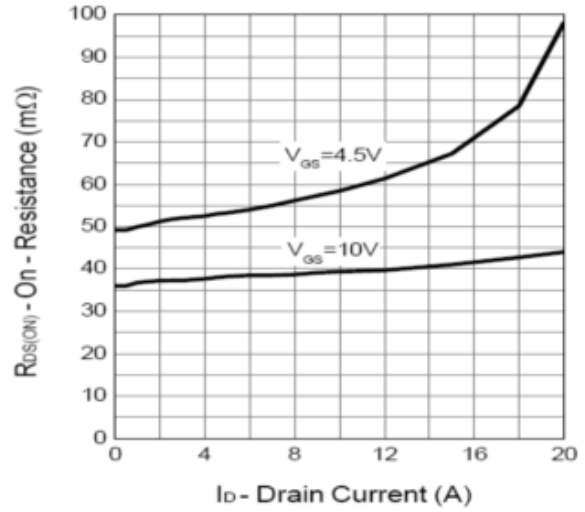
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=250\mu A, V_{GS}=0V$	60	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS}=48V, V_{GS}=0V$	-	-	1	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 25V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	2	2.5	V
Static Drain-to-Source On-State Resistance	$R_{DS(on)}$	$I_D=5A, V_{GS}=10V$	-	38	52	m Ω
	$R_{DS(on)}$	$I_D=4A, V_{GS}=4.5V$	-	55	75	m Ω
Input Capacitance	C_{iss}	$V_{DS}=30V,$	-	915	-	pF
Output Capacitance	C_{oss}	$V_{GS}=0V,$	-	70	-	
Reverse Transfer Capacitance	C_{rss}	$f=1MHz$	-	45	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GEN}=10V,$	-	9	17	nS
Rise Time	t_r	$V_{DS}=30V,$	-	6	12	
Turn-off Delay Time	$t_{d(off)}$	$R_L=30\Omega, I_D=1A,$	-	25	46	
Fall Time	t_f	$R_{GEN}=6\Omega$	-	5	10	
Total Gate Charge	Q_g	$V_{DS}=30V,$	-	19	27	nC
Gate-to-Source Charge	Q_{gs}	$V_{GS}=10V,$	-	4.4	-	
Gate-to-Drain "Miller" Charge	Q_{gd}	$I_D=5A$	-	4.4	-	
Diode Forward Voltage	V_{SD}	$I_S=2.5A, V_{GS}=0V$	-	0.8	1.1	V

N-Channel Typical Characteristics at $T_a=25^\circ\text{C}$

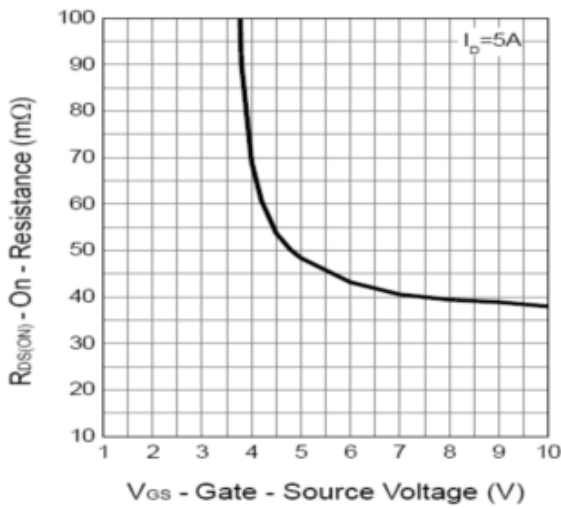
Output Characteristics



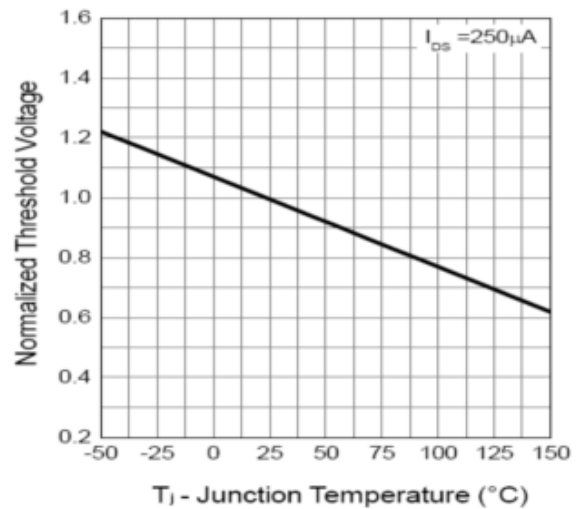
Drain-Source On Resistance



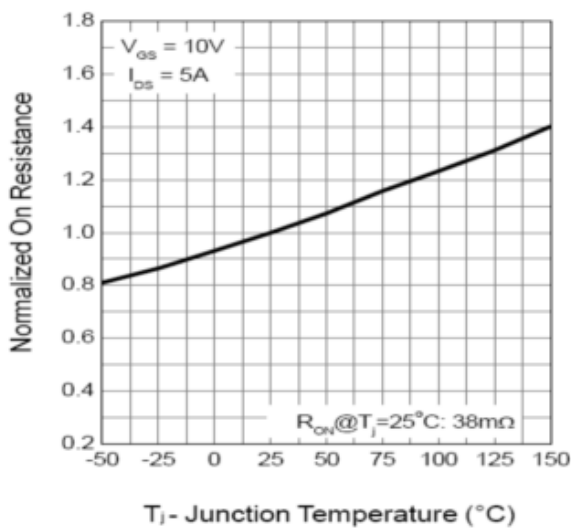
Drain-Source On Resistance



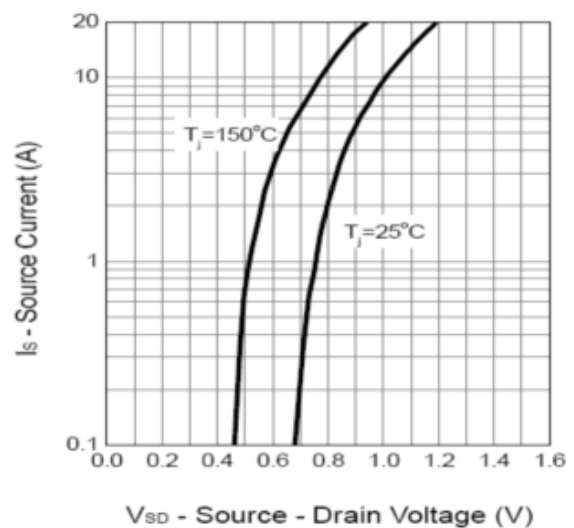
Gate Threshold Voltage



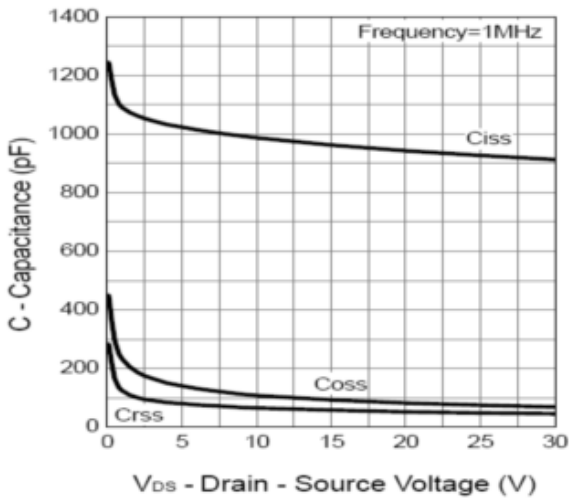
Drain-Source On Resistance



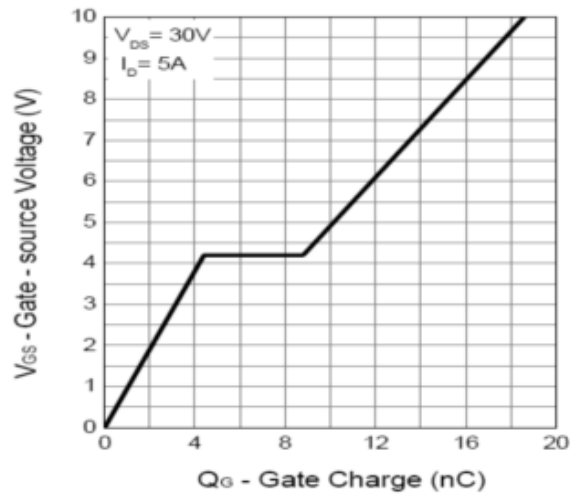
Source-Drain Diode Forward



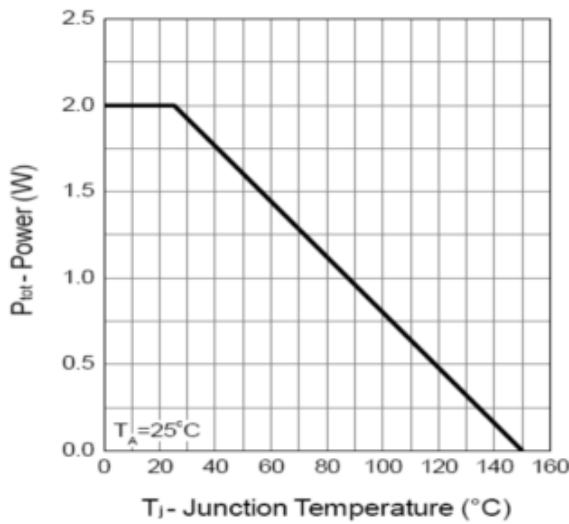
Capacitance



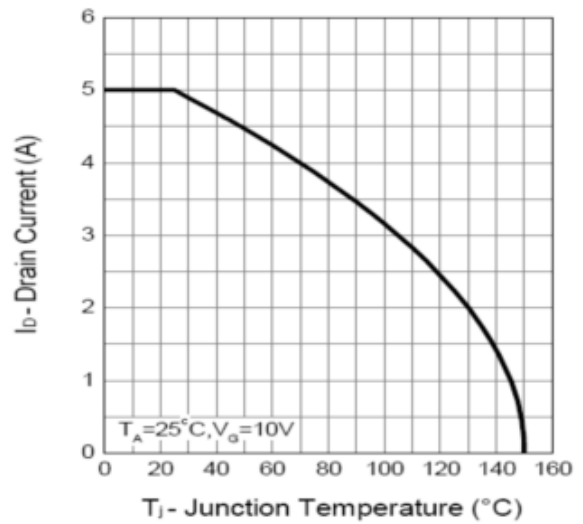
Gate Charge



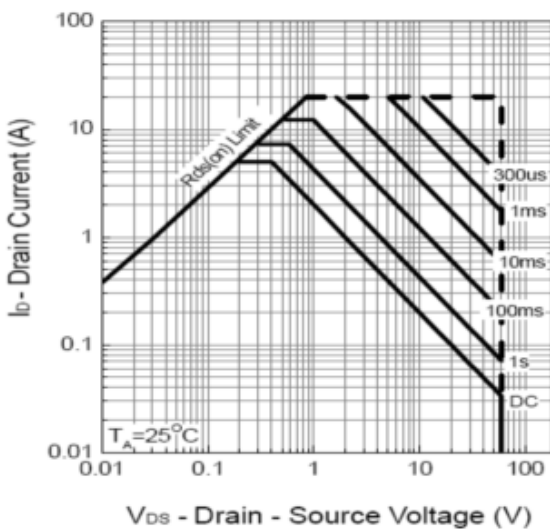
Power Dissipation



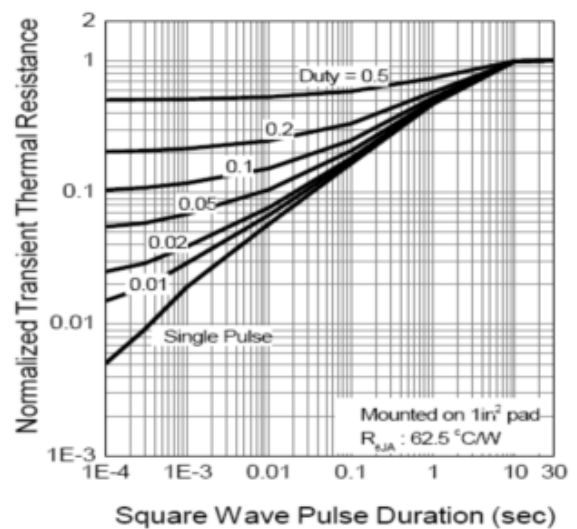
Drain Current



Safe Operation Area



Thermal Transient Impedance

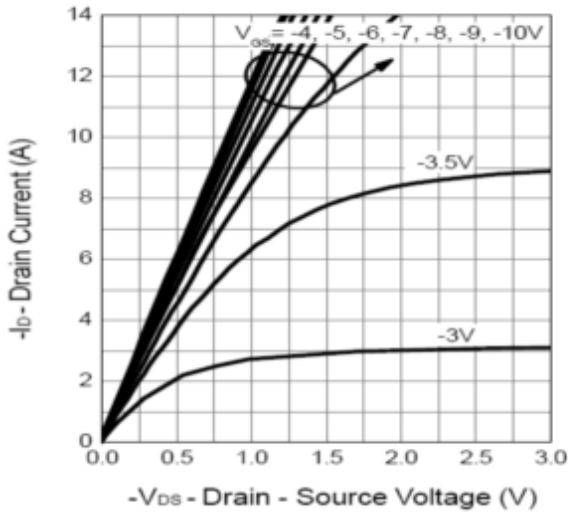


P-Channel Electrical Characteristics at $T_a=25^{\circ}\text{C}$

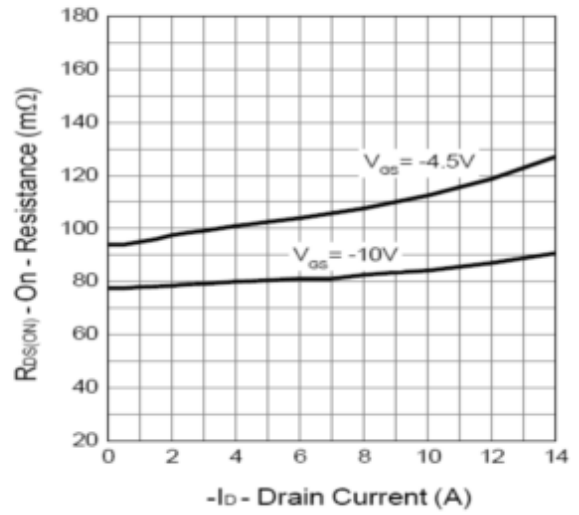
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=-250\mu\text{A}, V_{GS}=0\text{V}$	-60	-	-	V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-48\text{V}, V_{GS}=0\text{V}$	-	-	-1	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 25\text{V}, V_{DS}=0\text{V}$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-1	-2	-2.5	V
Static Drain-to-Source On-State Resistance	$R_{DS(ON)}$	$I_D=-3.5\text{A}, V_{GS}=-10\text{V}$	-	80	100	m Ω
	$R_{DS(ON)}$	$I_D=-3.1\text{A}, V_{GS}=-4.5\text{V}$	-	100	135	m Ω
Input Capacitance	C_{iss}	$V_{DS}=-30\text{V},$	-	1050	-	pF
Output Capacitance	C_{oss}	$V_{GS}=0\text{V},$	-	70	-	
Reverse Transfer Capacitance	C_{rss}	$f=1\text{MHz}$	-	50	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GEN}=-10\text{V},$	-	7	14	nS
Rise Time	t_r	$V_{DS}=-30\text{V},$	-	8	15	
Turn-off Delay Time	$t_{d(off)}$	$R_L=30\Omega, I_D=-1\text{A},$	-	47	86	
Fall Time	t_f	$R_{GEN}=6\Omega$	-	17	32	
Total Gate Charge	Q_g	$V_{DS}=-30\text{V},$	-	22	31	nC
Gate-to-Source Charge	Q_{gs}	$V_{GS}=-10\text{V},$	-	2.8	-	
Gate-to-Drain "Miller" Charge	Q_{gd}	$I_D=-3.5\text{A}$	-	5	-	
Diode Forward Voltage	V_{SD}	$I_S=-2.5\text{A}, V_{GS}=0\text{V}$	-	-0.8	-1.1	V

P-Channel Typical Characteristics at $T_a=25^{\circ}\text{C}$

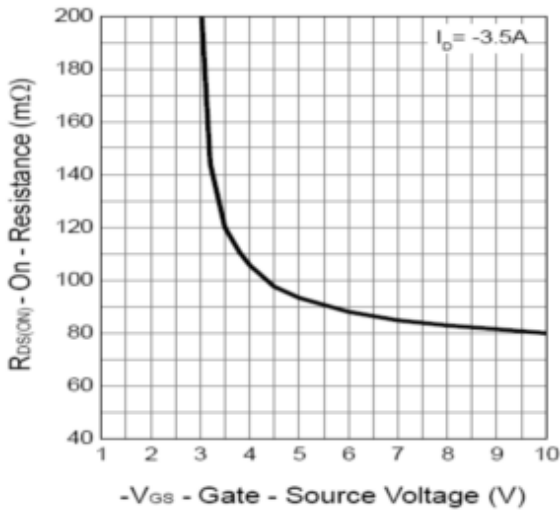
Output Characteristics



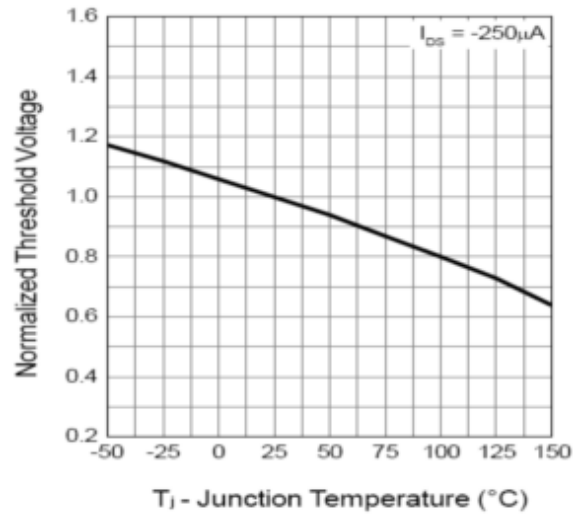
Drain-Source On Resistance



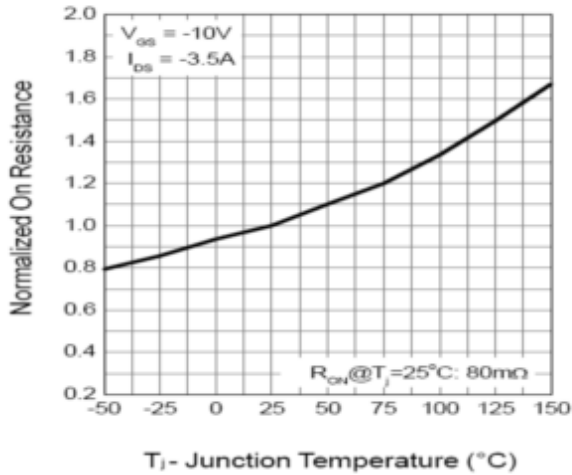
Drain-Source On Resistance



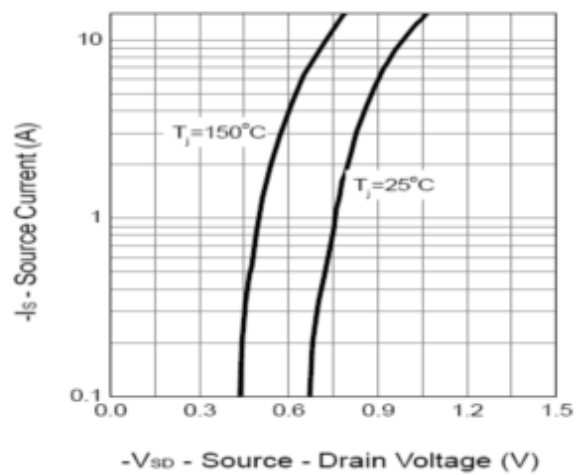
Gate Threshold Voltage



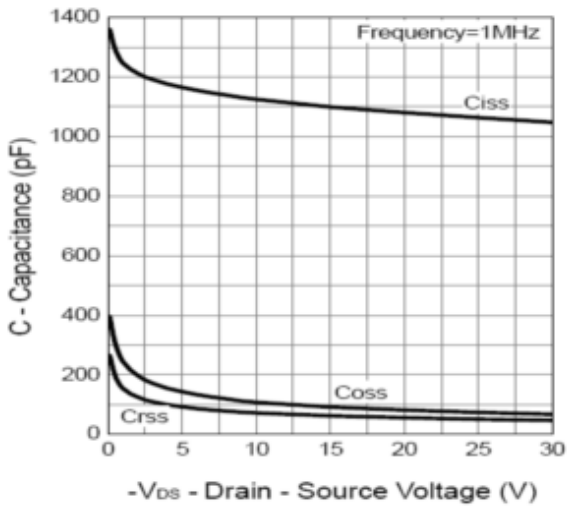
Drain-Source On Resistance



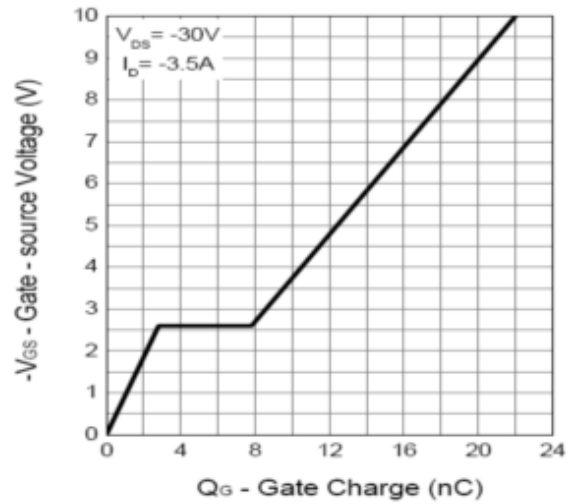
Source-Drain Diode Forward



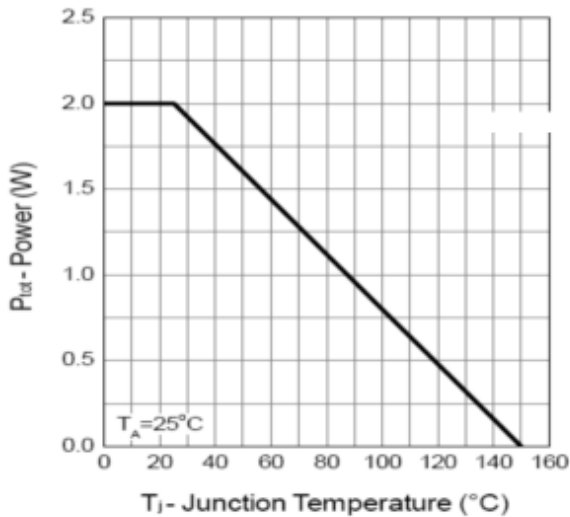
Capacitance



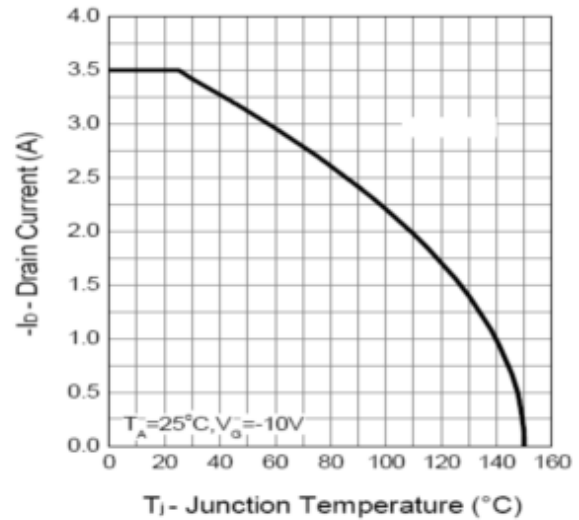
Gate Charge



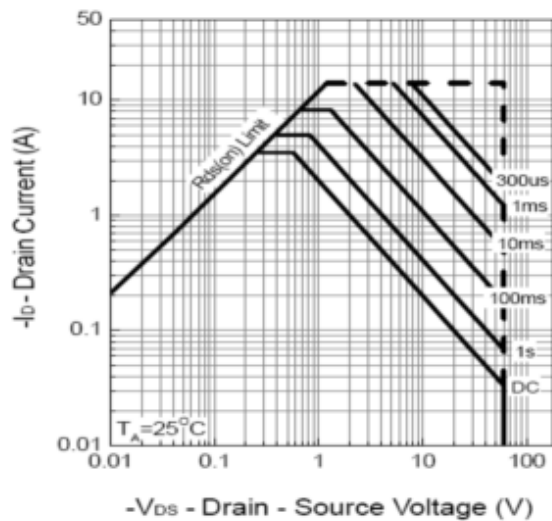
Power Dissipation



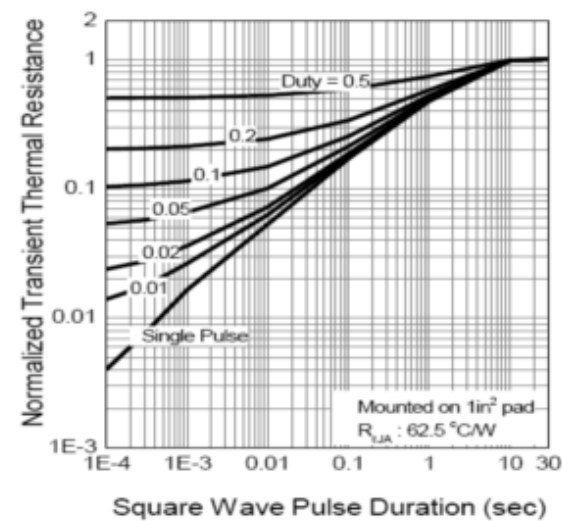
Drain Curre.



Safe Operation Area



Thermal Transient Impedance



SOP8 Package Dimension

